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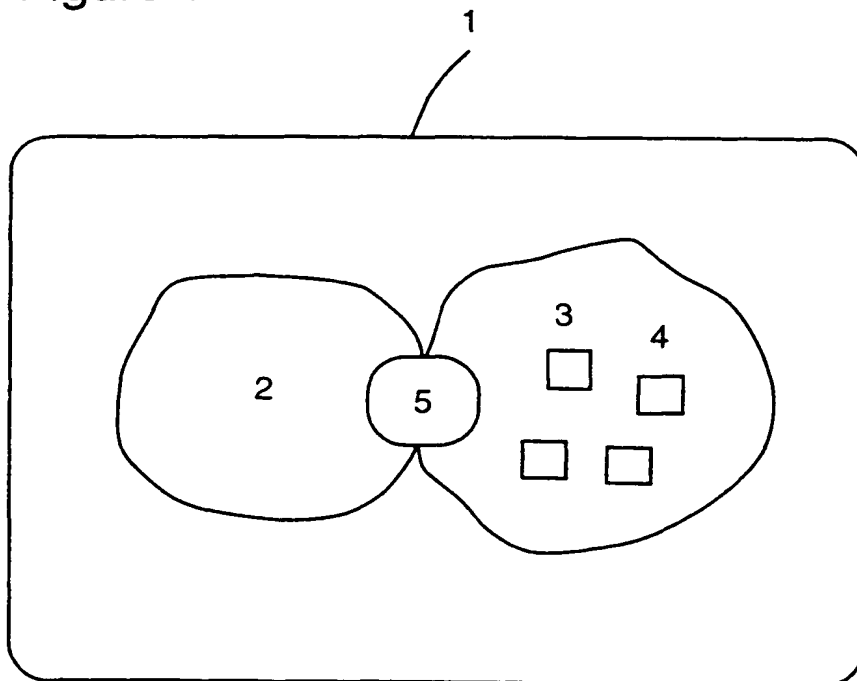
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(54) Telecommunications system with person/subscriber-associated identification

(57) Telecommunications system (1) including a fixed tele-and datacommunications system (2), here called fixed system, and a radio communications system (3) for instance of the type variant of the GSM-system, here called mobile system, which latter mobile system includes mobile units (4). Respective mobile unit of a number of mobile units, for instance all mobile units,

is arranged for connection to optional subscriber- or extension line in the fixed system via connection device (for instance jack), and that in the fixed and/or the mobile system arranged identification devices (5) identify the via said connection device to the fixed system connected mobile unit for making possible debiting of the use of the mobile unit in the fixed system.

Figure 1



Description

TECHNICAL FIELD

The invention relates to a device according to the introduction to the patent claims.

PRIOR ART

It has previously been suggested different ways and devices to forward telephone calls.

By the European document EP,A2, 484067 automatic forwarding of calls is described. Calls are automatically forwarded to a subscriber who is on the move by collecting information about position when the subscriber performs certain actions, such as for instance makes his/her purchases by means of a credit card or makes a call by means of a credit card.

The American patent document 5315636 shows a "personal telecommunications system" where a subscriber only need a personal telephone number and where a call to this number is automatically connected to the telephone terminal which is nearest the subscriber. The subscriber carries a personal communication unit which by means of radio communication allows that his/her position can be determined. The position is registered in a database and when a call is coming in to the subscriber the call is connected to the terminal which corresponds to the subscriber's present or latest known position.

DESCRIPTION OF THE INVENTION

TECHNICAL PROBLEM

The aim with the invention is to achieve one in relation to the prior art improved and simplified telecommunications system.

In the future the public land-based telecommunications network will allow personal mobility, i.e. that the subscriber shall have the possibility to register himself/herself at an optional telecommunication terminal at the location where the subscriber is at present, or to/from where he/she wants his/her incoming/outgoing calls connected. When debiting shall take place, it shall at that be possible to perform against the subscriber which is the owner of just that terminal. Today work is performed to make it possible to combine this personal mobility (UPT) with the terminal mobility which is offered by the mobile systems. A disadvantage with the UPT-service is that the subscriber has to make a call to register himself/herself at just that telephone. This function is similar to the roaming function which is used in the mobile systems, but with the difference that the function there is automatized. The technical problem the invention relates to is therefore to produce a device and a method which allows automatic registration in the fixed public telecommunications network for the service per-

sonal number at connection to and utilization of a portable telecommunications terminal in the fixed telecommunications network.

THE SOLUTION

The above mentioned aims are achieved by the invention showing the in the enclosed patent claims indicated characteristics.

The main characteristics of the invention is briefly that one or more mobile units are arranged for connection to optional subscriber- or extension line in the fixed telecommunications network via connection device, for instance jack, and that in the fixed and/or mobile system arranged identification devices identify the via said connection device to the fixed network connected mobile unit to make possible debiting of the use of the mobile unit in the fixed network. Further, the system can be entered by connection to the connection device of the subscriber- or extension line by means of mobile unit of the type which exists in cellular radio communications systems such as for instance GSM, NMT etc, and that the telecommunications system is arranged to operate with mobility functions which correspond to the mobility functions of the cellular system.

The telecommunications system also shows a construction which at comparison with the cellular system has the BSC- and BTS-functions replaced for connection of fixed subscriber lines, and that existing mobility functions are implemented in a UPT-system and where connections have been established for the connectivity to said UPT-system of the mobile units.

ADVANTAGES

The invention gives a lot of advantages, among other things a better and more flexible communications system is obtained. Further the handling of the mobile telephones or the mobile stations is made easier. The probability that one will reach a person one is in search of is increased. The use of one telephone number for a subscriber in his/her different situations in the course of a day also causes that the accessibility and the availability will increase.

DESCRIPTION OF FIGURES

The invention will now be described by means of not restricted examples of embodiment and with references to enclosed, schematically performed drawings. In the drawings:

Figure 1 shows a telecommunications network according to the invention.

Figure 2 shows the change from mobile GSM to "fixed GSM".

DETAILED DESCRIPTION

In Figure 1 is shown an embodiment of the invention telecommunications system 1 including a fixed tele- and data communications system 2, here called fixed system, and a radio communications system 3, for instance of the type variant of the GSM-system, here called mobile system, which latter mobile system includes mobile units 4, at which respective mobile unit of a number of mobile units, for instance all mobile units 4, are arranged for connection to optional subscriber - or extension line in the fixed system via connection device (for instance jack), and that in the fixed and/or the mobile system arranged identification devices 5 identify the via said connection device to the fixed system connected mobile unit for making possible debiting of the use of the mobile unit in the fixed system.

The total coverage of the mobile telephone network is divided into switch areas, MSC-areas, which in their turn can consist of one or more traffic areas, "Location areas". Characteristic for a location area is that a mobile can move within the area without the need to update a traffic area register, "location register". Within each location area there are a number of base stations connected which have coverage over local areas called cells.

The location areas consist of a number of "Base Station Systems" (BSS). A base station system covers a base station area consisting of one or more cells. The Base Station System consist of Base Station Controller (BSC), and a number of stations including both transmitters and receivers, so called Base Transceiver Stations (BTS).

BSC is a network component which controls one or more BTSes, at which the main tasks are managing of traffic channel by channel allocation, control and disconnection of link, and power control as well as managing of measurements at handover.

A BTS is a network component which serves a cell. BTS contains one or more combined transmitters/receivers, Transceivers (TRX).

A PLMN is accordingly divided into one or more mobile telephone switches depending on the size of the system (capacity and coverage) the operator provides in his/her system.

The mobile telephone switch is called a "Mobile Service Switching Center" (MSC). The MSC operates as interface between the fixed telephone network and the mobile telephone network (Gateway MSC) and between a number of MSCs which serve different geographical parts of the network.

The mobile station is the subscriber's equipment which can be mounted in a car or be handportable. In GSM there is an obvious difference between the physical device and the subscription. All information which is bound to the subscriber is stored on a "smart card" which can be used in just any mobile station.

The visitor register (location area register) "Visited

Location Register" (VLR) contains subscriber information for those who are in the location areas belonging to this VLR. When subscriber "mobile" is searched for, "roaming number" is fetched by HLR which has a reference to the Visited Location Register (VLR) in question. In this way the network rapidly and efficiently can find the mobile at calls from the telecommunications network. Each mobile belongs to a home register, "Home Location Register" (HLR). This register contains all necessary subscriber- and mobile information, among other things information about in which VLR and location area the mobile is.

HLR is the register which gateway MSC or a telephone station (in the fixed network) asks for to get "roaming number" to wanted mobile. If a mobile moves from one location area to another, all relevant register parameters of the mobile are transferred from HLR to the VLR of the new location area. In HLR a reference is made to the new VLR.

The GSM-system has by the invention been further developed to comprise traffic also in the fixed network, resulting in that a combined terminal- and personal mobility can be offered the customers who want it, and in the future perhaps the majority of all subscribers. I.e. a GSM-variant where the mobility functions (for the SIM-card and by that the subscriber) still exist, but BSC and BTS are replaced for connection of fixed-subscriber lines.

The invention results in at least two new components, one of which in the network: - One "GSM local switch" - One "fixed GSM-telephone", respective one "dual mode telephone" (dealt with in a separate patent application).

A "GSM local switch" without any real switch function but with subscriber stage, irrespective of whether these are remote or not. This "local switch" connects the subscribers via the A-interfaces with MSC, which is the proper switch. Because handover is not needed at wire-based telephony, the BSC-function consequently can be replaced by this simple "local switch" which can manage all signalling from MSC. The subscribers are divided into "Local Areas" in a way that a registering subscriber (= telephone with SIM-card) can make an authentication and updating of the localization registers (HLR/VLR). The signalling to/from the fixed telephone is made with DTMF, which in the "local switch" is converted to signalling for the A-interface.

It must be emphasized that this UPT-functionality only can be offered the subscriber lines which are connected to a "GSM local switch" (= access point for a fixed GSM-telephone).

In Figure 2 is shown how the mobile GSM-network in principle is changed in such a way that it can offer fixed telephony in the form of an UPT-service. It must be noticed that the two MSCs might be replaced by one which handles both "fixed" and mobile subscribers. It is further assumed that all MSCs in a network are connected.

The telecommunications system according to the invention consists of a fixed tele- and data communications system (also called a general public fixed system) and a radio communications system for instance of the type variant of the GSM-system which we chose to call a mobile communications system with a number of portable mobile telephones. These mobile telephones can be connected to optional subscriber lines and extension lines. This can be done in many different ways, for instance by different types of jacks and connection devices.

When the mobile unit is connected to the fixed network the identification device identifies that it is a mobile telephone which is connected. The identification device consists, to certain parts, of known functionality from corresponding devices from the conventional mobile telephony system, as well as other functions which are indicative of signals emanating from the conventional fixed system. These signals which are forwarded in the network are sensed by the network and makes possible that payment of a call which emanates from the fixed network can be debited the subscription which is connected to the mobile telephone.

The idea of the invention also can be described as device at universal personal telecommunications system (UPT) where subscribers in the system have possibility to enter or get access to the system via optional subscriber- or extension connection. The system identifies the entered subscriber to make possible debiting of the subscriber's use of the system. Further, the system can be entered by connection to connection device (subscriber- or extension jack) of the subscriber- or extension line by means of mobile unit of the type which exists in cellular radio communications systems. Usually of the type variant of the GSM-system at which the telecommunications system is arranged to operate with mobility functions which correspond to the mobility functions of the cellular radio communications system.

The telecommunications system further shows a construction which in comparison with the cellular radio based system has the BSC- and BTS-functions replaced for connection of fixed subscriber lines.

A use of the idea according to the invention is that mobility functions in cellular radio communications system, preferably of the type GSM, where the positions for the mobile units of the system can be traced by means of identification devices to make possible debiting of the use of the system by the different subscribers, at which the mobility functions are implemented in a universal personal telecommunications system (UPT) where connections/jacks to fixed subscriber- and extension lines have been arranged for the connectivity of respective mobile unit to the universal personal telecommunications system.

Another idea of using can be described as a use of mobile unit and mobility functions which exists in cellular radio communications system, preferably of the type GSM-system. The mobile unit is used as mobile device

in a fixed telecommunications system which executes universal personal telephony by means of mobility functions which correspond to the mobility functions in the cellular radio communications system, in which fixed system connections are made via connection devices/ connection jacks to subscriber- or extension lines.

According to one variant of the idea of invention the invention also can be described as a device at universal personal telecommunications system (UPT) where subscriber in the system has possibility to enter the system via optional subscriber- or extension connection and the system at that identifies the entering subscriber to make possible debiting of the subscriber's use of the system. The system operates with mobility functions which correspond to the mobility functions in a cellular radio communications system, preferably the GSM-system, that it instead of the in the cellular radio communications system existing BSC- and BTS-stages are arranged connections for fixed subscriber lines.

One unit is arranged to connect the subscribers transparently via a fixed connection with BSC (compare the function for the cellular radio communications system) which operates with switching function.

The mentioned unit for connection of the subscribers replaces in principle said BSC-function, which unit has concentrator function.

The mentioned unit for connection of the subscribers replaces in principle said BSC-function, which unit has concentrator function.

The subscribers are in the same way as in the cellular radio communications system divided into location areas making it possible for a registering or entering subscriber (= telephone/mobile unit with SIM-card) to make an updating of the localization registers (compare HLR/VLR)

The invention is not restricted to the shown examples of embodiment, but can be varied in just any way within the frame of the idea of invention, such as it is defined in the following patent claims.

Claims

1. Telecommunications system (1) including a fixed tele- and data communications system (2), here called fixed system, and a radio communications system (3) for instance of the type variant of the GSM-system, here called mobile system, which latter mobile system includes mobile units (4), **characterized** in that respective mobile unit of a number of mobile units (4), for instance all mobile units, is arranged for connection to optional subscriber- or extension line in the fixed system via connection device (for instance jack), and that in the fixed and/or the mobile system arranged identification devices (5) identify the via said connection device to the fixed system connected mobile unit for making possible debiting of the use of the mobile unit in the

fixed system.

2. Device at universal personal telecommunications system (UPT) where subscribers in the system have possibility to enter the system via optional subscriber- or extension connection, and the system at that identifies the entered subscriber to make possible debiting of the subscriber's use of the system, **characterized** in that the system can be entered by connection to connection device (subscriber- or extension jack) of the subscriber- or extension line by means of mobile unit of the type which exist in cellular radio communications systems, preferably of the type variant of the GSM-system, and that the telecommunications system is arranged to operate with mobility functions which correspond to the mobility functions of the cellular radio communications system. 5
3. Device according to patent claim 2, **characterized** in that the telecommunications system shows a construction which at comparison with the cellular radio based system has the BSC- and BTS-functions replaced for connection of fixed subscriber lines. 10
4. Use of mobility functions in cellular radio communications system, preferably of the type GSM, where the positions for the mobile units of the system can be traced by means of identification devices to make possible debiting of the different subscribers' use of the system, **characterized** in that the mobility functions are implemented in a universal personal telecommunications system (UPT) where connections/jacks to fixed subscriber- and extension lines have been established for the respective connectivity of the mobile units to the universal personal telecommunications system. 15
5. Device at universal personal telecommunications system (UPT) where subscriber in the system has possibility to enter the system via optional subscriber- or extension connection, and the system at that identifies the entering subscriber to make possible debiting of the subscriber's use of the system, **characterized** in that the system operates with mobility functions which correspond to the mobility functions in a cellular radio communications system, preferably the GSM-system, that it instead of the in the cellular radio communications system existing BSC- and BTS-stages are arranged with connections for fixed subscriber lines. 20
6. Device according to patent claim 5, **characterized** in that a unit is arranged to connect the subscribers transparently via a fixed connection with BSC (compare the function of the cellular radio communications system) which operates with switching func- 25

tion.

7. Device according to patent claim 5 or 6, **characterized** in that said unit for connection of the subscribers in principle replaces said BSC-function, which unit has concentrator function. 30
8. Device according to any of the patent claims 5-7, **characterized** in that the subscribers in the same way as at the cellular radio communications system are divided into location areas making it possible for registering or entering subscriber (= telephone/mobile unit with SIM-card) to update the localization registers (compare HLR/VLR). 35
9. Use of mobile unit and mobility functions which exist in cellular radio communications system, preferably of the type GSM-system, **characterized** in that the mobile unit is used as mobile set in a fixed telecommunications system which executes universal personal telephony by means of mobility functions which correspond to the mobility functions in the cellular radio communications system, in which fixed system connections are made via connection device/connection jack to subscriber- or extension lines. 40
10. Device according to patent claim 9, **characterized** in that the mobile unit is used in both systems. 45
11. Device according to any of the previous patent claims, **characterized** in that the UPT-subscriber can be reached independent of where the subscriber is registered on a personal number, so called UPT-number, which UPT-subscriber in addition shall have possibility to have a personal profile of his/her own of additional and value added services, such as forwarding of call, voice mail etc. 50
12. Device at universal telecommunications system (UPT) **characterized** in that it is based on the mobility functions in a cellular radio communications system, preferably of the type GSM-system. 55

Figure 1

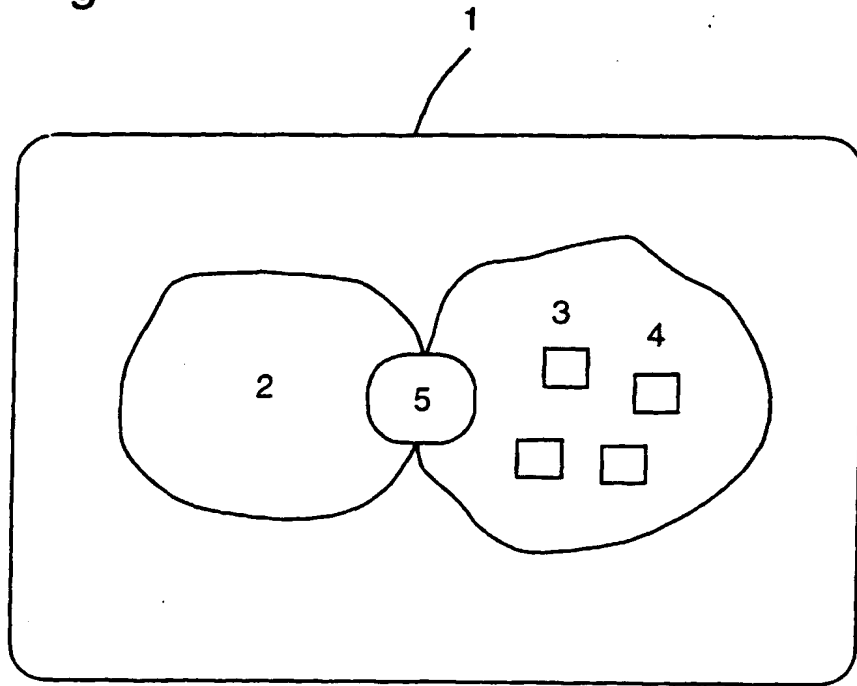
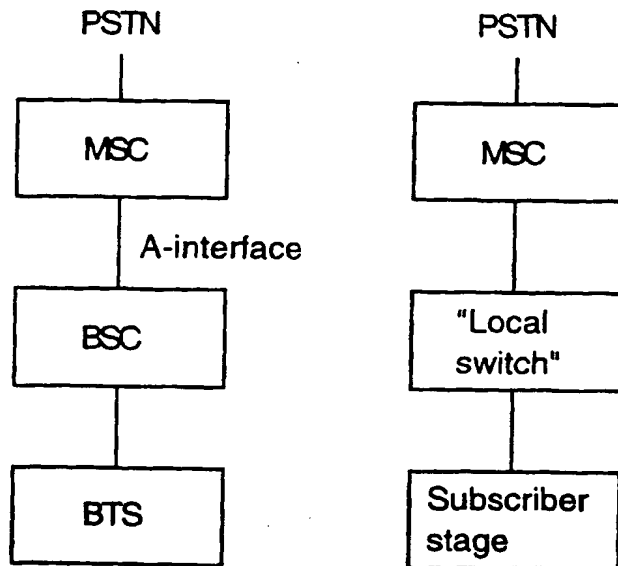


Figure 2



(19)



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(30) Priority: **23.03.1995 SE 9501051**

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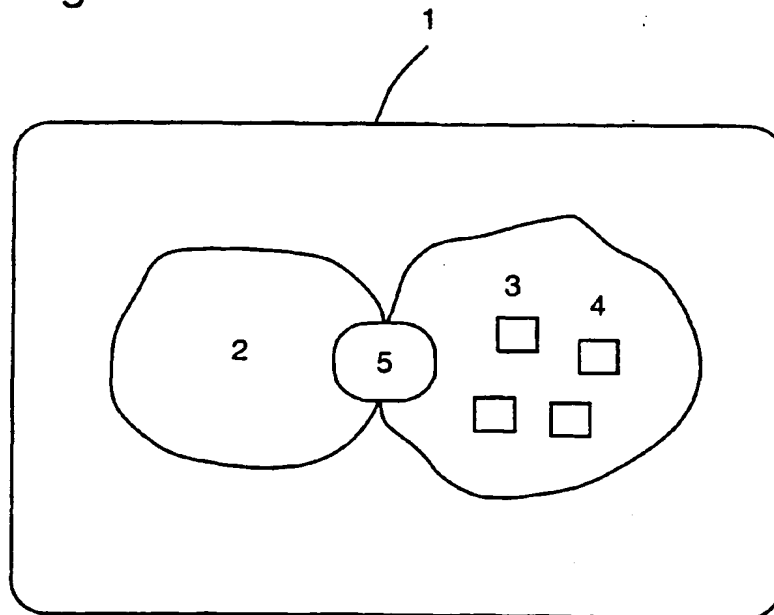
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Figure 1





European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 96 85 0053

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US 4 989 230 A (GILLIG STEVEN F ET AL) 29 January 1991 * column 2, line 8 - line 31 * * column 3, line 62 - column 4, line 19 * * column 5, line 4 - line 8 * ---	1,2,4,5, 9	H04M15/00 H04Q7/32 H04M3/42
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A	ARNDT G, GATTI N, LAVAGNOLO R : "INTERNATIONAL STANDARDS ON UNIVERSAL PERSONAL TELECOMMUNICATIONS: STATE OF THE ART AND FUTURE PROJECTIONS" 1ST INTERNATIONAL CONFERENCE ON UNIVERSAL PERSONAL COMMUNICATIONS, ICUP 92 PROCEEDINGS (CAT N°=92TH0434-1), DALLAS , TX, USA, 29 September 1992 - 1 October 1992, pages 03.01/1-5, XP002103549 * page 03.01.2, left-hand column, line 5 - line 16 * * page 03.01.02, left-hand column, line 49 - right-hand column, line 9 * -----	12	TECHNICAL FIELDS SEARCHED (Int.Cl.6) H04Q H04M
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 25 May 1999	Examiner VAUCOIS, X
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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